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This Field Reference Guide was created exclusively for Tomra by PCComplete Corporate Sales.

Written by Darryl Wattenberg, Fred Hodge, Marshall Miller, and Patrick Obloy.

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About This Reference Guide

This field reference guide was written specifically for Tomra by PCComplete Corporate Sales. PCComplete asks that you not copy this reference guide. If you need additional copies, please contact PCComplete for copies of the most current version.

This version (first edition, release 2) has been updated to include new information. Any of these additions or alterations reflect changes in the Tomra PCs since the November 1997 release of this manual. Since this is not a complete rewrite of the manual, there may be information in this release which references older Tomra PCs and might be slightly different in newer or upgraded Tomra PCs.

There are a few conventions followed in this reference guide. First, no section ever begins on the right-hand (even numbered) page. All sections start on the left-hand (odd numbered) pages. Many sections will not have any information on the last page. Please feel free to use these pages to make notes about any problems you may experience.

Also, we have used type styles to indicate different functions throughout the reference guide. Bold type within the text indicates a key or keystroke. *Italicized* type is the title of an issue within the section. ***Bold and italic*** type together indicates a section name. Knowing this should make using this field reference much easier.

It is important to remember while working with these computers that they are not exactly the same. If you encounter a component which is not where it is described in this reference guide, check in other places. It is possible that a card could have been placed in a different slot, or a drive in a different bay. This reference guide is designed to be a rough guide and not the bible of the Tomra Industrial PCs.

This field reference guide is only to be used for the Tomra Industrial PCs built by PCComplete. Compaq, DELL, Gateway, or any other manufacturer's computers are not covered by this reference guide and information in this reference guide will not work on those systems. If you experience a problem on one of these machines which you can not solve, it should be returned for service.

This reference guide will be updated as needed. If you experience an unusual or different problem, please let PCComplete know about the problem so that it can be added to the next release of the reference guide. Contact Darryl Wattenberg at 248/545-4211 or by fax at 248/545-4284.

Troubleshooting

This section will cover many of the common hardware problems which occur on a Tomra Industrial PC. Follow the large bold type from here to find the best description of your problem. The instructions will give you the basic information about repairing the problem and refer you to another section for the details. If you still have problems, check with your supervisor or PCComplete (248/545-4211).

This troubleshooting guide assumes that you have taken all possible steps to ensure that the problem is not caused by software. Check all settings before changing out components or opening the computer.

Remember that when you return a part for service to include a description of the problem. Without a good description, service personnel can not properly diagnose the problem and the part maybe returned with the same problem as it was sent out for.

No image on the monitor

1. Make sure that the monitor's power indicator is lit. If not, there is likely a problem with either the power to the monitor (possibly the power cable) or with the monitor itself. Try changing the power cable. Should this not solve the problem, plug the monitor into a different power outlet. If there is still no indicator light on the monitor, return the monitor for service.
2. Check the color of the indicator light on the monitor. If the light is amber (some monitors may have a blinking light or a power save light instead of changing colors) proceed to the next step. Otherwise, change the brightness and contrast settings on the monitor. If the screen remains black with no variation, return the monitor for service. If the monitor changes from a black screen to a gray screen, continue to the next step.
3. Check the lights on the front of the computer. There should be at least one light on the computer. If not, go to the problem called "*No lights on the computer*" and work through that problem. If that doesn't solve the problem, return to this step. Check the cable to make sure that it is securely fastened to the video port on the back of the computer. If this doesn't fix the problem, replace the cable if possible.

4. At this point we will assume that the video card is bad. Proceed to the *video card* section. Remember to ground yourself before touching any cards or devices in or outside the computer (see the *Support Info* section for more information).

Monitor image is unstable or has lines

1. Is the monitor close to any high power devices (e.g. furnace, circuit breakers, transformers)? If so, this may be the cause of the problem. Try a different monitor. If the problem persists, it is environmental and there is nothing that can be done.
2. If the new monitor solves the problem, there could be a problem with the old monitor. Take the old monitor with you. Leaving a monitor with these problems might mean another service call later for a dead monitor. Try the monitor at a different site and verify that the problem exists. If not, return it to use in the field.

Monitor has a checkerboard style pattern

1. If you have a video card available, try changing it out.
2. If that does not work, verify that the monitor is connected properly and that the pins in the connector are not bent of broken.
3. Provided that the monitor is functioning properly, change out the whole computer. If you would like to retain the data from the old computer, though it is not recommend, you may be able to swap the hard drive between the two computers (*see the Floppy & Hard Drives section*). The computer should be returned for service.

Computer not booting

There are several error messages which will be displayed when you have this problem. Look through the next few problems. If none of these describe the problem, call PCComplete (248/545-4211) for more options.

No lights on the computer

1. Make sure that the computer does not have the power indicator lit. If not, check the fan on the back near the power connections. If that is not running it is likely a problem with either the power to the computer (possibly

the power cable) or with the computer itself. Try changing the power cable. Should this not solve the problem, plug the computer into a different outlet. If there is still no indicator light on the computer and fan is not working, return the computer for service.

2. If the fan is running and the lights are not on, try booting from a DOS floppy. If the floppy drive is working and the machine appears to boot and you don't see anything on the monitor, you may have a video problem. If there is nothing displayed on the monitor read the information about *no image on the monitor*. If everything appears to be functioning, but there are still no lights, they may have been disconnected from the main board. This does not cause a functionality problem, but if it is a concern, return it for service.

Hard disk failure

1. Go to the *Main Board* section and check to make sure that the computer is set for the right type of hard drive.
2. If the problem persists (or if the drive is not recognized), open the case and check the cables. For more information see the *Floppy & Hard Drives* section.
3. With the case open, disconnect the IDE cable from the hard drive and turn on the computer's power. (Warning: If you are not comfortable with working on the computer while in the field, do not continue with this step.) If you hear noise from the hard drive, power the computer down, trace the IDE cable back to the main board and replace the IDE cable. Make sure to attach it securely to both the main board and the hard drive itself (see the *Floppy & Hard Drives* section).
4. Remove the I/O card and try again. If this corrects the problem, check the I/O card settings. If those settings are correct, replace the I/O card with a new one.
5. If none of these correct the problem return the computer for service.

Floppy drive failure

1. Go to the *Main Board* section of the Reference Guide and check to make sure that the computer is set for the right type of floppy drive.

2. If the problem persists, open the case and check the cables. For more information see the *Floppy & Hard Drives* section.
3. The next course of action is to replace the cable between the main board and the floppy drive. (Warning: If you have any doubt about performing this type of service in the field, skip this step.) Follow the cable back from the floppy drive to the main board. Remove the cable from the main board and replace it with the new cable. Now remove the old floppy cable from the floppy drive itself and replace it with the new one (see the *Floppy & Hard Drives* section).
4. Remove the I/O card and try again. If this corrects the problem, check the I/O card settings. If those settings are correct, replace the I/O card with a new one.
5. If none of these correct the problem, either replace the floppy drive (see the *Floppy & Hard Drives* section) or return the computer for service.

"Non-System Disk" or "Disk Error" message

1. Make sure that you don't have a floppy disk in the drive. If so remove the disk and press enter.
2. If the computer still displays the message it should be returned for service.

"Missing Operating System" message

The computer's hard drive has most likely been corrupted. The computer should be returned for service.

Problems reading floppies

A problem has occurred on two computers where the first disk inserted into the floppy drive works, but each disk inserted after that does not. The only fix for this problem is to replace the floppy disk drive (see the *Floppy & Hard Drives* section). Before replacing the floppy drive, make sure that the floppy drive is reading the first disk. If not you have another problem (see *floppy drive failures*).

Downloads are not working

1. Facing the back of the computer, is there an orange sticker over two ports to the right side in one of the slots? (Warning: the sticker may have fallen off. Check for two

ports, a DB9 and a DB25, to the right side of the computer in one of the slots.) If so, is the serial cable attached to that DB9 (COM port)? If not, connect the cable there and retry. If there are no ports in any of the slots, check to the left side or the computer for a DB9 and a DB25 which are usually located above the fan and power connections. Make sure the cable is securely fastened to that DB9 (If the ports on the back of the computer still don't work, go to the section *Main Board* and look for the information about resetting the BIOS to factory defaults).

2. After checking the cable connections and the cable, if it still doesn't work, check the Multi I/O card (if installed) against the settings in the *Multi I/O Card* section of this reference guide. If something was not correctly configured on the card, correct it and test the download again.
3. If the Multi I/O card still is not functioning, enter the BIOS and verify that the on-board ports are disabled (see the *Main Board* section). If so, then you will need to either replace the Multi I/O card (see the *Multi I/O Card* section) or remove it (see the *Main Board* section *about resetting default settings*). If this doesn't solve the problem, return the computer for repair.

Modem not working

1. Use a regular telephone to check that the telephone line into the computer is working.
2. Make sure that the telephone line is plugged into the "TELCO" or "LINE" port of the modem. Make certain that it is not plugged into the "PHONE" port.
3. If the modem still doesn't work, replace it with a new one. Make sure to follow the steps in the *Modem Card* section.

System is losing a day

This is a simple problem with a simple solution. Due to a software and hardware conflict on some of the Tomra PCs, the reboot software must be added. If you do not have the reboot installer disk, contact your supervisor.

The Main Board

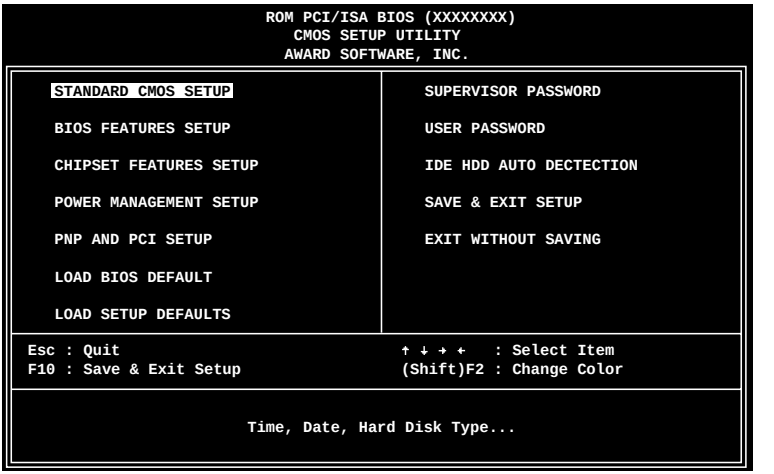
The main board is the main intelligence of the Tomra Industrial PC. It is the part which has all the slots, controls the use of drives, controls the COM, LPT, and modem, accesses the RAM, and communicates with the processor. The main board is also called the logic board or the motherboard. Do not touch this board or its connections whenever possible.

As of July 1999, the Tomra Industrial PCs use five different main boards and six processors. Make sure to identify which one you have before performing any work in this section.

Identifying the board

When you first enter BIOS setup (hold down the **delete** key during start-up) the boards can be identified by looking at the top line of the BIOS Main Menu. The ASUS main boards (VX97, TXP4, TXP4-X, P5A, and P5A-B) will have their name in the parens (ie. "(<<P5A>>)"). The Biostar UUD will have a code (ie. 2A4X5B08) instead of the name but should have only 6 options on the left side of the screen (including only one default setting). The screens at the bottom of these pages show the Setup Main Menu for each of these main boards.

As a general rule, any Tomra PC with the last four digits of the serial number greater than "0249" will use the ASUS main boards. Machines not fitting that description maybe either Biostar UUD or ASUS main boards depending on when



ASUS main boards– Main Menu (may vary depending on model & revision)

they were last in for service. All computers with UUD main boards are being upgraded as they arrive in for service to Pentium level processors and main boards. All ASUS main boards are Pentium level or better.

Exiting Setup without saving

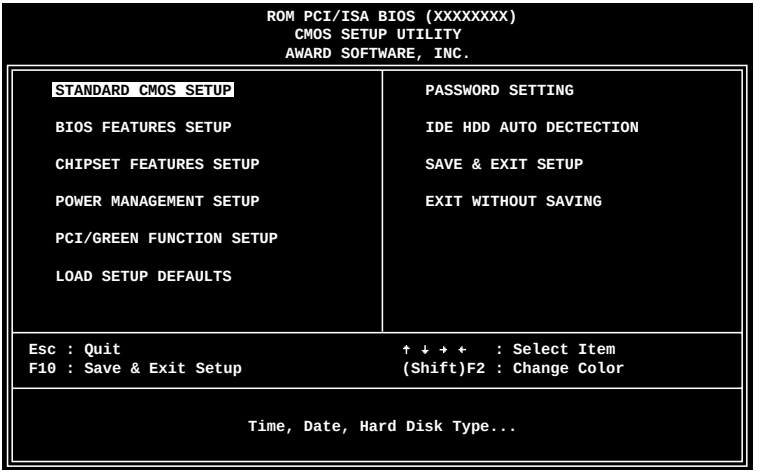
If you happen to change something accidentally while in the BIOS Setup, to cancel the changes, press Esc from the Main Menu. The computer will ask for verification. Type “Y” and press return.

Resetting default settings

Once you have entered the BIOS Setup, determine which board you are working with. On the ASUS main boards, select the “Load BIOS Defaults” option. On the Biostar UUD, select the “Load Setup Defaults.” Press return. The computer will ask for verification. Type “Y” and press return. Press F10 to exit setup. Again you will be prompted for verification. Type “Y” and press return. The factory default settings have been restored.

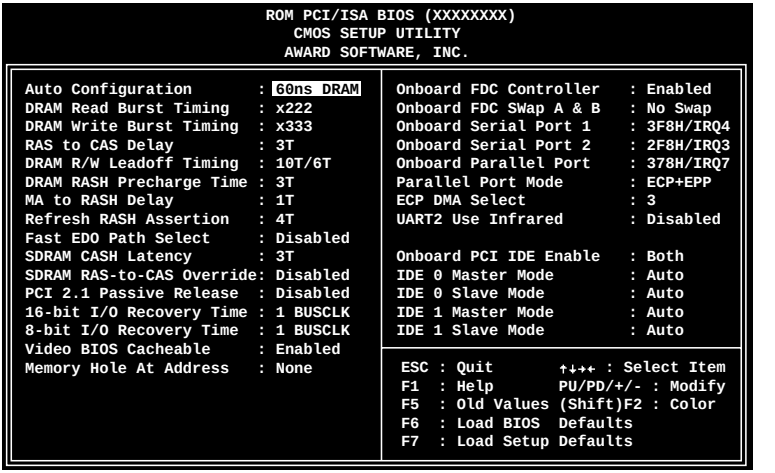
Turning off the on-board ports

If you are installing a Multi I/O card into a computer which did not have one, you will need to disable the on-board ports first. If the on-board ports are not disabled, it can cause multiple problems.

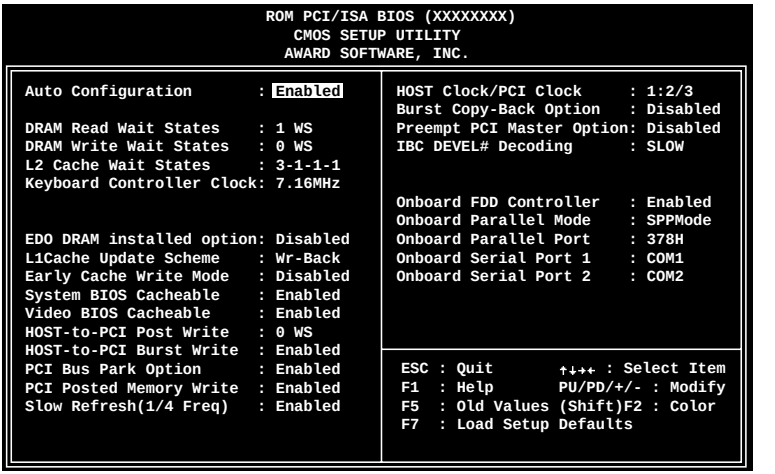


Biostar UUD – Main Menu

Once you have entered the BIOS Setup, select the "Chipset Feature Setup." Press return. The two different boards will have a different look to the Chipset Feature Setup" menu, however, the names for the options are still the same (see the screens on the next page). Use the arrow keys on the keyboard to select the "Onboard Parallel Port." Use the Page Up or Page Down keys till "Disabled" is displayed next to the "Onboard Parallel Port" option. Use the arrow keys again to move to the next port to be disabled (Onboard Serial Port 1). Again, use the Page Up or Page Down keys until "Disabled" is displayed next to the "Onboard Serial Port 1" option. Use the arrow keys again to move to the last port to be disabled (Onboard Serial Port 2). Again, use the Page Up

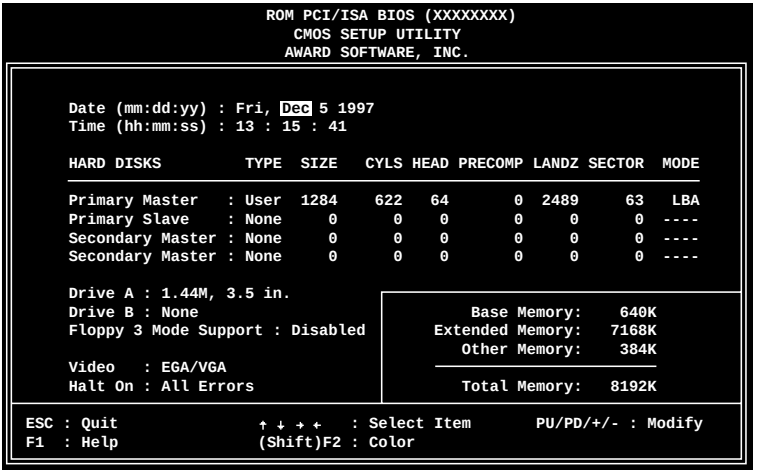

ROM PCI/ISA BIOS (XXXXXXXX)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.
Auto Configuration : 60ns DRAM
DRAM Read Burst Timing : x222
DRAM Write Burst Timing : x333
RAS to CAS Delay : 3T
DRAM R/W Leadoff Timing : 10T/6T
DRAM RASH Precharge Time : 3T
MA to RASH Delay : 1T
Refresh RASH Assertion : 4T
Fast EDO Path Select : Disabled
SDRAM CASH Latency : 3T
SDRAM RAS-to-CAS Override: Disabled
PCI 2.1 Passive Release : Disabled
16-bit I/O Recovery Time : 1 BUSCLK
8-bit I/O Recovery Time : 1 BUSCLK
Video BIOS Cacheable : Enabled
Memory Hole At Address : None
Onboard FDC Controller : Enabled
Onboard FDC SWap A & B : No Swap
Onboard Serial Port 1 : 3F8H/IRQ4
Onboard Serial Port 2 : 2F8H/IRQ3
Onboard Parallel Port : 378H/IRQ7
Parallel Port Mode : ECP+EPP
ECP DMA Select : 3
UART2 Use Infrared : Disabled
Onboard PCI IDE Enable : Both
IDE 0 Master Mode : Auto
IDE 0 Slave Mode : Auto
IDE 1 Master Mode : Auto
IDE 1 Slave Mode : Auto
ESC : Quit ↑↓→← : Select Item
F1 : Help PU/PD/+/- : Modify
F5 : Old Values (Shift)F2 : Color
F6 : Load BIOS Defaults
F7 : Load Setup Defaults

ASUS main boards – Chipset Feature Setup


ROM PCI/ISA BIOS (XXXXXXXX)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.
Auto Configuration : Enabled
DRAM Read Wait States : 1 WS
DRAM Write Wait States : 0 WS
L2 Cache Wait States : 3-1-1-1
Keyboard Controller Clock: 7.16MHz
EDO DRAM installed option: Disabled
L1Cache Update Scheme : Wr-Back
Early Cache Write Mode : Disabled
System BIOS Cacheable : Enabled
Video BIOS Cacheable : Enabled
HOST-to-PCI Post Write : 0 WS
HOST-to-PCI Burst Write : Enabled
PCI Bus Park Option : Enabled
PCI Posted Memory Write : Enabled
Slow Refresh(1/4 Freq) : Enabled
HOST Clock/PCI Clock : 1:2/3
Burst Copy-Back Option : Disabled
Preempt PCI Master Option: Disabled
IBC DEVEL# Decoding : SLOW
Onboard FDD Controller : Enabled
Onboard Parallel Mode : SPPMode
Onboard Parallel Port : 378H
Onboard Serial Port 1 : COM1
Onboard Serial Port 2 : COM2
ESC : Quit ↑↓→← : Select Item
F1 : Help PU/PD/+/- : Modify
F5 : Old Values (Shift)F2 : Color
F7 : Load Setup Defaults

Biostar UUD – Chipset Feature Setup

or Page Down keys till “Disabled” is displayed next to the “Onboard Serial Port 2” option. Once all three port options show disabled, press the “Esc” key to return to the Main Menu. From there, press F10 to exit setup. You will be prompted for verification. Type “Y” and press return.


ROM PCI/ISA BIOS (XXXXXXXX)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.
Date (mm:dd:yy) : Fri, Dec 5 1997
Time (hh:mm:ss) : 13 : 15 : 41
HARD DISKS TYPE SIZE CYLS HEAD PRECOMP LANDZ SECTOR MODE
Primary Master : User 1284 622 64 0 2489 63 LBA
Primary Slave : None 0 0 0 0 0 0 ----
Secondary Master : None 0 0 0 0 0 0 ----
Secondary Master : None 0 0 0 0 0 0 ----
Drive A : 1.44M, 3.5 in.
Drive B : None
Floppy 3 Mode Support : Disabled
Video : EGA/VGA
Halt On : All Errors
Base Memory: 640K
Extended Memory: 7168K
Other Memory: 384K
Total Memory: 8192K
ESC : Quit
F1 : Help
↑ ↓ → ← : Select Item
(Shift)F2 : Color
PU/PD/+/- : Modify

ASUS main boards – Standard CMOS Setup
The Biostar UUD varies only slightly from this screen.

Checking and setting drive information

To check or set the drive information you will need to use the “Standard CMOS Settings” option from the main setup menu. When the system is experiencing trouble with the hard drive or floppy drive, or when adding a floppy drive you will need to use this menu option. In most case you will not need to change the settings in this menu. If you are adding or changing a hard drive see *Auto detecting hard drives* in this section.

Once you have entered the BIOS Setup, select the “Standard CMOS Setup.” Press return. The two different boards will have almost identical menus for this option (see the screen above). While you're in this menu, you might want to check the date and time (see *Setting the date and time*). Otherwise, locate the information that you need.

The hard drive is listed as the “Primary Master.” The size number is displayed in megabytes. It should roughly match the type of drive in the computer (850, 1280, or 2112 – any hard drive larger than 2GB is locked to the 2GB DOS barrier). This number will not be an exact match though. As a general rule, allow 30 megabytes in either direction. If this

number is not correct, see the information about *auto detecting hard drives* later in this section. If any of the drive types read "AUTO," use the arrow keys to select each of them, then use the page up or page down keys to change the type to "NONE." Remember that the primary master should still be set to "USER" with the sizes still set. Only the primary slave, secondary master, and secondary slave should be "NONE."

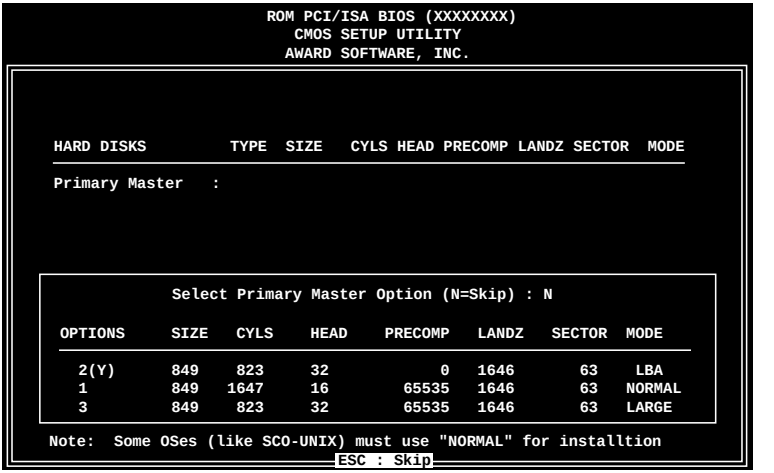
Most Tomra Industrial PCs should only have a 3.5" floppy drive. Look at the setting for "Drive A." It should read "1.44M, 3.5 in." If not, use the arrow keys to select it. Once it is highlighted, use the page up and page down keys till the correct value appears next to the "Drive A" option.

To exit, press the "Esc" key to return to the Main Menu. If you have made any changes, press F10 to exit setup. You will be prompted for verification. Type "Y" and press return. If you have not made changes, press the "Esc" key again. You will be prompted for verification. Type "Y" and press return.

Auto detecting hard drives

Rarely should you need to auto detect hard drives. In the event that you have lost the drive settings or are changing the hard drive, following the steps below.

Once you have entered the BIOS Setup, select "IDE HDD Auto Detection." Press return. After a moment the computer will display a list of options similar to the screen below. (If you do not see the options, check the hard drive and connec-


ROM PCI/ISA BIOS (XXXXXXXX)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.
HARD DISKS TYPE SIZE CYLS HEAD PRECOMP LANDZ SECTOR MODE
Primary Master :
Select Primary Master Option (N=Skip) : N
OPTIONS SIZE CYLS HEAD PRECOMP LANDZ SECTOR MODE
2(Y) 849 823 32 0 1646 63 LBA
1 849 1647 16 65535 1646 63 NORMAL
3 849 823 32 65535 1646 63 LARGE
Note: Some OSes (like SCO-UNIX) must use "NORMAL" for installtion
ESC : Skip

ASUS VX97 – IDE HDD Auto Detection
The Biostar UUD varies only slightly from this screen.

tions.) Type the letter “Y” and press return. The next three drives will not have any options. Press the return key till you see the main menu again. To save the changes and exit from setup, press F10 to exit setup. You will be prompted for verification. Type “Y” and press return. If you have not made changes, press the “Esc” key again. You will be prompted for verification. Type “Y” and press return.

Setting the time and date

To change the time and date settings, select the “Standard CMOS Setup” from the main setup menu. Press return. The month should be selected when you enter the “Standard CMOS Setup.” Using the page up or page down keys, select the current month. Press the right arrow key. The day should now be selected. Use the page up or page down keys till the current day is displayed. Press the right arrow key. The year should now be selected. Using the page up or page down keys, select the current year. The date information should now be correct.

Press the right arrow key to select the hours. Use the page up and page down keys till the current hour is displayed in 24 hour format (i.e. 2:00pm will be 14:00). Press the right arrow key to select the minutes. Use the page up and page down keys till the current minutes are displayed. Press the right arrow key to select the seconds. Use the page up and page down keys till the current seconds are displayed. Press the right arrow key. The time information should now be correct.

To exit, press the “Esc” key to return to the Main Menu. If you have made any changes, press F10 to exit setup. You will be prompted for verification. Type “Y” and press return. If you have not made changes, press the “Esc” key again. You will be prompted for verification. Type “Y” and press return.

Power Management Setup on P5A & P5A-B

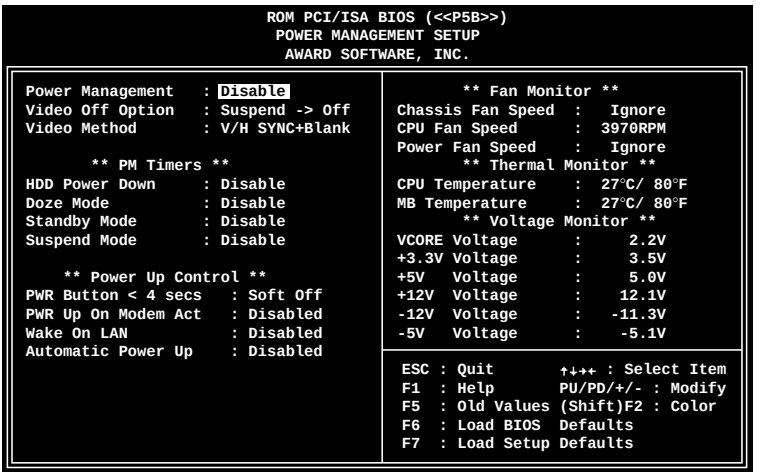
The newer main boards (P5A & P5A-B) have option power and thermal monitors built-in to the main board. We highly suggest that these monitors be used as it can alert you to a pending hardware failure. PCComplete sets these monitors whenever a PC is assembled or arrives for service so in most cases you will not need to change their setting. However, loading either BIOS or Setup Defaults will return these

monitors to predefined values and may not be compatible with the particular PC you are working on.

There is only one setting that will change depending on the configuration of the machine Some of the processor fans connect to one of the leads from the power supply rather than connecting to the main board. If the processor fan is not connected to the main board, the system cannot monitor the fan speed. Without opening the computer's case, it is possible to tell which type of fan is installed. Once inside the Power Management Menu, select and enable the CPU Fan Speed monitor. Give it a few seconds to update. If it does not give you an RPM reading, disable it – you do not have a fan whose speed can be monitored. If it does have an RPM rating, the fan can be monitored. Leave the CPU Fan Speed set and continue to the other monitors.

Most of the monitors should be enabled. There are only two which are never enabled on a Tomra PC. These are the Chassis Fan Speed and the Power Fan Speed. The CPU Fan Speed should be enabled only when the computer is equipped with a fan that connects to the main board (see above). All of the Thermal and Voltage Monitors should be enabled. These monitors will watch for conditions which you could not otherwise detect.

To enable or disable a monitor, move the cursor with the arrow keys over the monitor to enable or disable. Press either the page up or page down key. The value should switch between "Ignore" and "Error" or a value (see illustration).

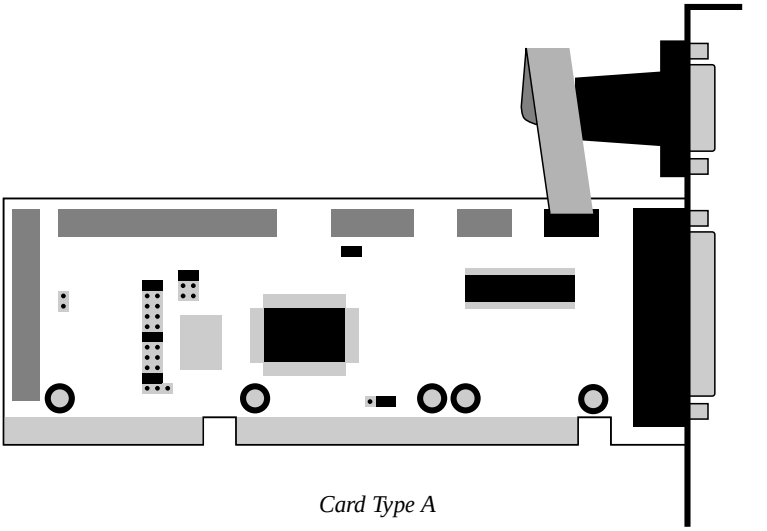

ROM PCI/ISA BIOS (<<P5B>>)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.
Power Management : Disable
Video Off Option : Suspend -> Off
Video Method : V/H SYNC+Blank
** PM Timers **
HDD Power Down : Disable
Doze Mode : Disable
Standby Mode : Disable
Suspend Mode : Disable
** Power Up Control **
PWR Button < 4 secs : Soft Off
PWR Up On Modem Act : Disabled
Wake On LAN : Disabled
Automatic Power Up : Disabled
** Fan Monitor **
Chassis Fan Speed : Ignore
CPU Fan Speed : 3970RPM
Power Fan Speed : Ignore
** Thermal Monitor **
CPU Temperature : 27°C/ 80°F
MB Temperature : 27°C/ 80°F
** Voltage Monitor **
VCORE Voltage : 2.2V
+3.3V Voltage : 3.5V
+5V Voltage : 5.0V
+12V Voltage : 12.1V
-12V Voltage : -11.3V
-5V Voltage : -5.1V
ESC : Quit ↑↓→← : Select Item
F1 : Help PU/PD/+/- : Modify
F5 : Old Values (Shift)F2 : Color
F6 : Load BIOS Defaults
F7 : Load Setup Defaults

ASUS P5A – Power Management Setup
The ASUS P5A -B varies only slightly from this screen.

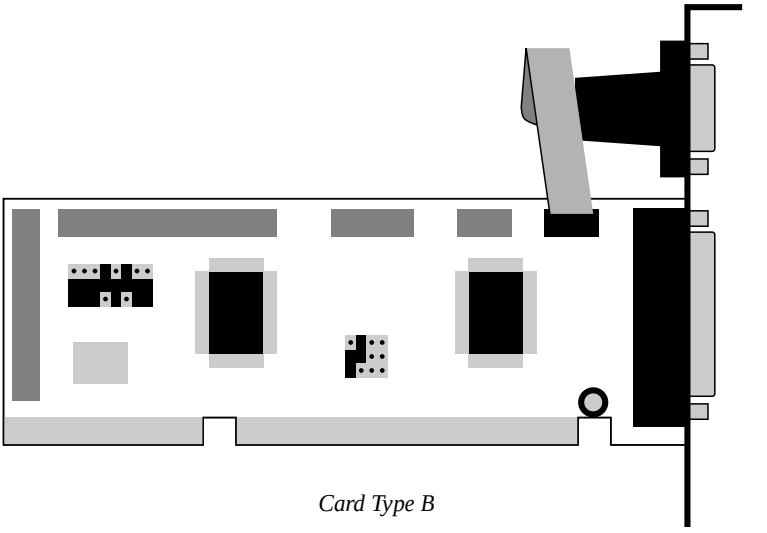
After a monitor is enabled, allow a few seconds for the value to be displayed. The actual values for these monitors are dependant on the type of processor installed. The main board knows the parameters for each processor and will only alert the user of a problem when conditions fall outside the parameters for the installed processor.

Multi I/O Card

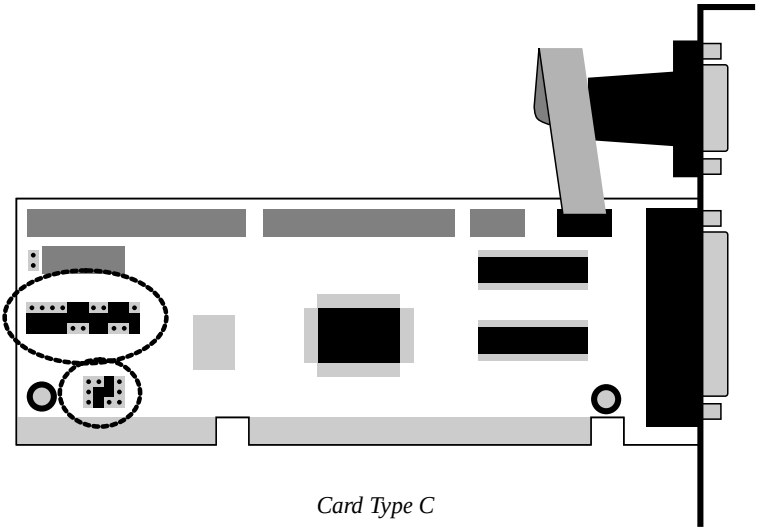
The Multi I/O card was added to the Tomra Industrial PCs in mid-1997 to guard against the serial port failure on the main board. Due to the extreme environmental conditions which the serial (COM) port is subjected to, the main boards were frequently being damaged. The Multi I/O card acts as a "surge protector" for the main board. Fortunately when a Multi I/O card is damaged it can be replaced in the field. When the main board is damaged the computer has to be returned for service. Additionally, the ports on the main board are still connected, but not enabled. This means that if a failure occurs the on-board ports can be re-enabled.



Card Type A



Card Type B



Card Type C

The Tomra Industrial PCs use three different Multi I/O cards. Make sure to identify which one you have before performing work in this section.

Identifying the card

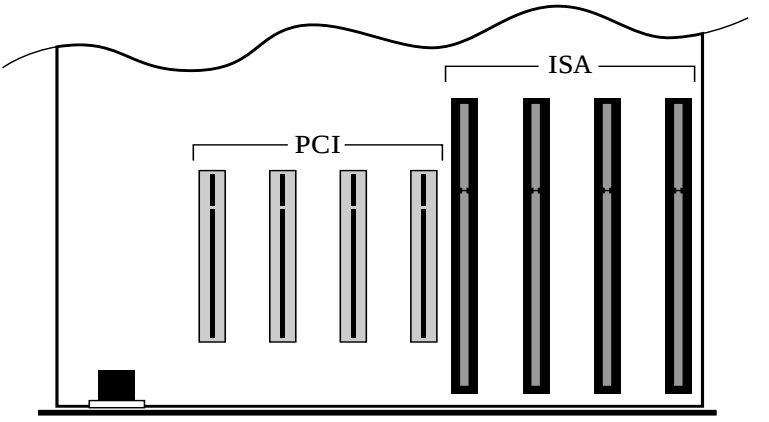
Look at the Multi I/O card with the component side (the side with the pins) facing you. Card type A will have set of pins (11 tall and 2 wide) with the bottom most row having an extra pin (see the diagram opposite page). Card type B will have two large chips, one set of pins (3 tall and 8 wide) with 8 jumpers, and a set of 12 pins (3 tall and 4 wide) with only two jumpers (see the diagram opposite page). Card type C will have two smaller chips, one set of pins (3 tall and 11 wide) with 11 jumpers, and a set of 12 pins (3 tall and 4 wide) with only two jumpers (see the diagram opposite page). Though all cards operate exactly the same, the jumper settings are different.

Where does it go in the computer?

The Multi I/O card is an ISA card. Looking into the computer with the back facing you, the ISA slots are on the right side (see the illustration below). Generally you will want to use the slot at the far right for the Multi I/O card. The next best location would be the slot second from the right. Using either of these two slots will keep the Multi I/O card in roughly the same place on all Tomra Industrial PCs.

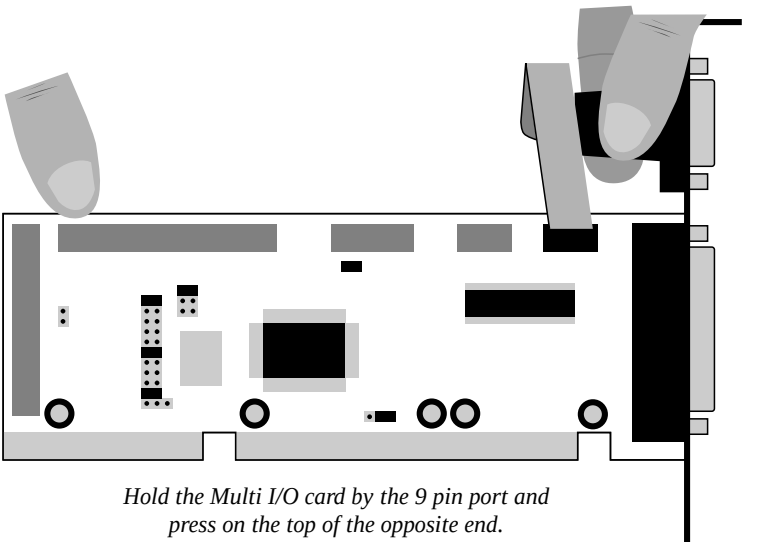
Inserting the Multi I/O card

When you install the Multi I/O card in the computer, make sure to handle it with extreme care. Hold the card by the back of the 9 pin port (see illustration). Guide the card into



Back of Computer

the slot and against the hole for the slot on the case (if there is no hole in the case, read the information about *opening a slot cover*). Make sure that the bottom of the card is lined up to the groove in the slot, then firmly press on the top of the opposite end of the card (see illustration) while still pushing on the 9 pin port, but do not force the card into place. To verify that the card is in place correctly, look at the base of the card. If any of the silver pins are visible above the slot connector, try seating the card again. Once the card is cor-



Hold the Multi I/O card by the 9 pin port and press on the top of the opposite end.

rectly seated, use a case screw (the short screws with a phillips and hex head) to screw the top of the folded metal piece into the back of the case.

Opening a slot cover

There are two different cases used for the Industrial PCs. The original case has screw-in slot covers which connected to the back of the computer much the same as the cards do. If this is the type of case you are working on, select the slot cover to open, then remove the screw and slot cover. If you are working on one of the newer PCs, there may not be a removable slot cover. The newer cases have punch-out panels and snap-in slot covers. Before you knock out the panel though, check to see if it is a slot cover, hold it firmly between your fingers and slide it up. The slot cover should snap out. If you do not have a slot cover but the punch-out is still in place, use a screwdriver or an awl and press at the top of the slot cover. Gently hit the back of the screwdriver or awl till the punch-out is freed from the top of the case. Using your hand, rock the panel toward and away from the back of the computer. Make sure not to touch any of the components with the panel. After a little work the panel should break free. This panel can be discarded. You should now have an open slot for your card.

What are the settings for the cards?

Remember that each type of card is different and has completely different jumper settings. It is imperative that you correctly identify the card before checking or modifying any settings. The illustrations on the next page show the correct jumper settings.

Also make sure that the DB9 port which is attached to the top of the card is connected to the pins at the top, closest to the back of the card (see the illustration next page). If the DB9 port is connected to the wrong connection on the Multi I/O card, it will be unusable and generate errors while downloading.

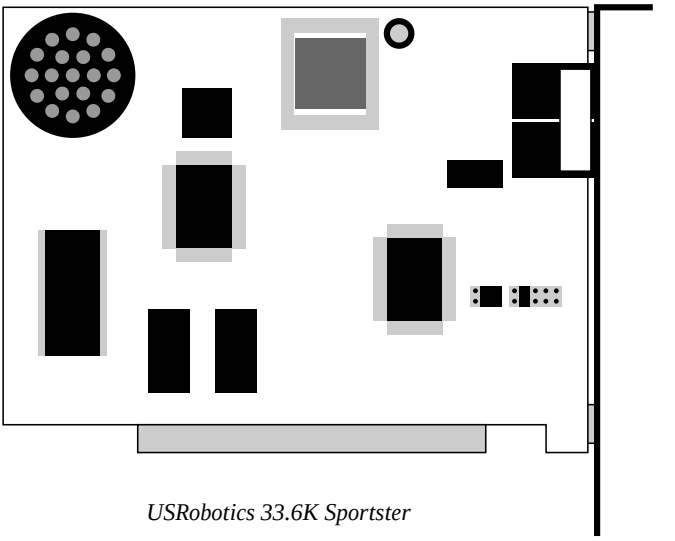
Card Type A – Primary Jumper Settings

Card Type B – Primary Jumper Settings

Card Type C – Primary Jumper Settings

Modem Card

Tomra Industrial PCs use the USRobotics Sportster internal modems. As of December 1997, only two models have been installed in these computers. There is very little difference between these two models.



USRobotics 33.6K Sportster

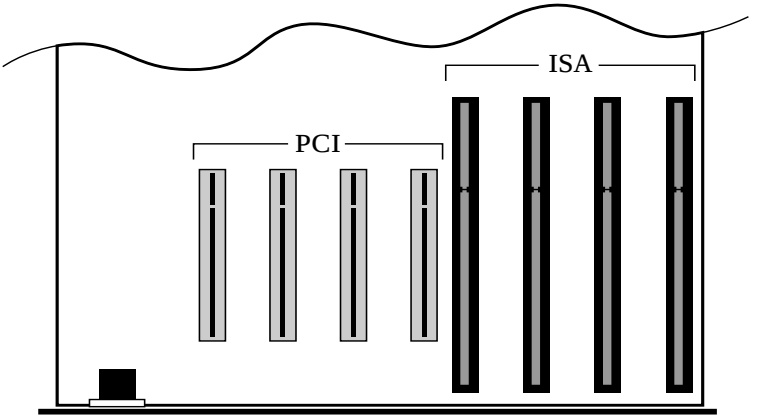
Where do the cables go?

There are two telephone jacks on the back of the modem. The top one is labeled “PHONE” and should be used only for pass through devices (i.e. a telephone or fax). The bottom port is labeled “TELCO.” Use the “TELCO” port to connect to the wall connection (the connection from the telephone company). If the cables are reversed the modem will not be able to use the phone line even though a telephone connected through the modem will. It is extremely important that the connection from the telephone company is connected to the bottom port.

Where does it go in the computer?

The modem is an ISA card. Looking into the computer with the back facing you, the ISA slots are on the right side (see the illustration). Generally you will want to use the second ISA slot from right for the modem card. The next best location would be the left most ISA slot. Using either of these

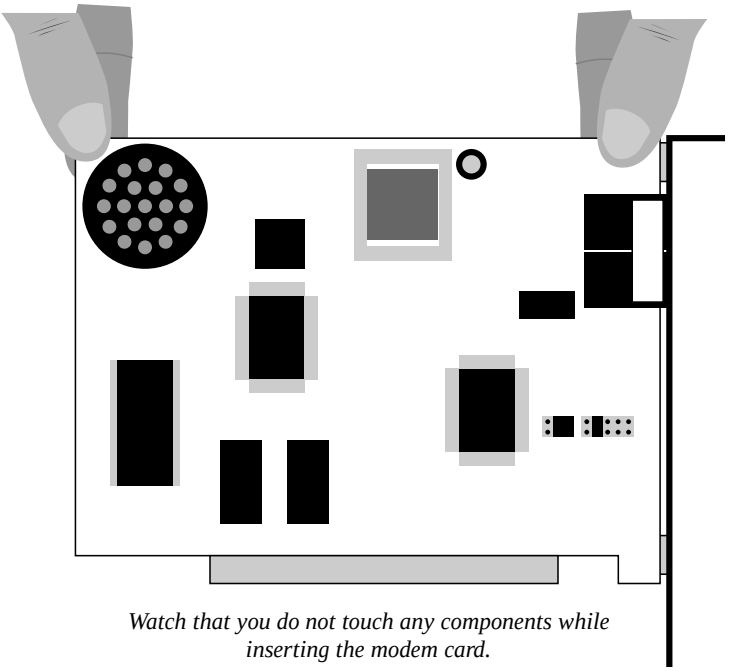
two slots will keep the modem card in roughly the same place on all Tomra Industrial PCs.



Back of Computer

Inserting the modem card

When you install the modem card in the computer, make sure to handle it with extreme care. Hold the card opposite the gold connections and avoid touching any of the components on the surface of the card (see illustration). Guide the card into the slot and against the hole for the slot on the case



Watch that you do not touch any components while inserting the modem card.

(if there is not a hole for the card, read the information about *opening a slot cover*). Make sure that the bottom of the card is lined up to the groove in the slot, then press firmly on the top of the card while still holding the card steady, but do not force the card into place. To verify that the card is in place correctly, look at the base of the card. If any of the gold pins are visible above the slot connector, try seating the board again. Once the card is correctly seated, use a case screw (the short screws with a phillips and hex head) to screw the top of the folded metal piece into the back of the case.

Opening a slot cover

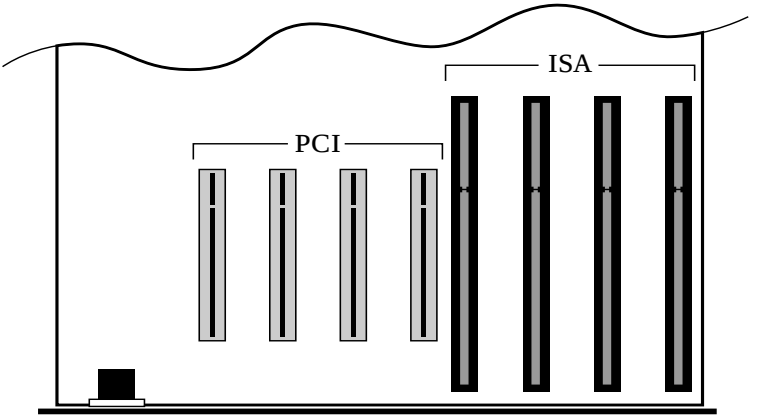
There are two different cases used for the Industrial PCs. The original case has screw-in slot covers which connected to the back of the computer much the same as the cards do. If this is the type of case you are working on, select the slot cover to open, then remove the screw and slot cover. If you are working on one of the newer PCs, there may not be a removable slot cover. The newer cases have punch-out panels and snap-in slot covers. Before you knock out the panel though, check to see if it is a slot cover. If there is a slot cover, hold it firmly between your fingers and slide it up. The slot cover should snap out. If you do not have a slot cover but the punch-out is still in place, use a screwdriver or an awl and press at the top of the slot cover. Gently hit the back of the screwdriver or awl till the punch-out is freed from the top of the case. Using your hand, rock the panel toward and away from the back of the computer. Make sure not to touch any of the components with the panel. After a little work the panel should break free. This panel can be discarded. You should now have an open slot for your card.

Video Card

Tomra Industrial PCs use two different video cards. Fortunately there are no settings on these cards so there is no need to identify their differences.

Where does it go in the computer?

The video card is a PCI card. Looking into the computer with the back facing you, the PCI slots are on the left side (see the illustration below). You will want to use the first PCI slot for the video card. Using this slot will keep the video card in roughly the same place on all Tomra Industrial PCs and ensure a proper fit.



Back of Computer

Inserting the video card

When you install the video card in the computer, make sure to handle it with extreme care. Hold the card opposite the gold or silver connections and avoid touching any of the components on the surface of the card. Guide the card into the slot and against the hole for the slot on the case (if the card does not fit into the open slot read the information about *opening a slot cover*). Make sure that the bottom of the card is lined up to the groove in the slot. Then press firmly on the top of the card while still holding the card steady, but do not force the card into place. To verify that the card is in place correctly, look at the base of the card. If any of the gold pins are visible above the slot connector, try seating the board again. Once the card is correctly seated, use a case screw (the short screws with a phillips and hex head) to

screw the top of the folded metal piece into the back of the case.

Opening a slot cover

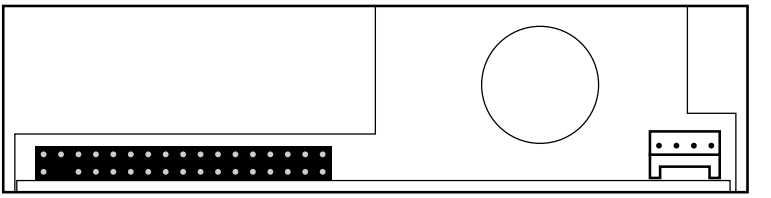
There are two different cases used for the Industrial PCs. The original case has screw-in slot covers which connected to the back of the computer much the same as the cards do. If this is the type of case you are working on, select the slot cover to open, then remove the screw and slot cover. If you are working on one of the newer PCs, there may not be a removable slot cover. The newer cases have punch-out panels and snap-in slot covers. Before you knock out the panel though, check to see if it is a slot cover. If there is a slot cover, hold it firmly between your fingers and slide it up. The slot cover should snap out. If you do not have a slot cover but the punch-out is still in place, use a screwdriver or an awl and press at the top of the slot cover. Gently hit the back of the screwdriver or awl till the punch-out is freed from the top of the case. Using your hand, rock the panel toward and away from the back of the computer. Make sure not to touch any of the components with the panel. After a little work the panel should break free. This panel can be discarded. You should now have an open slot for your card.

Floppy & Hard Drives

This section will cover information about both the floppy drive and the hard drive. It is recommended that neither the hard drive or the floppy drive be replaced in the field, but it is sometimes unavoidable. Remember that this is extremely volatile work and if you have any questions or problems call PCComplete immediately (248/545-4211).

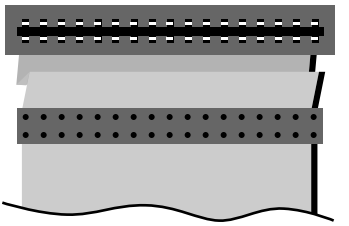
Checking the floppy drive cables

Once the case is open, follow the floppy drive back from the front of the case. It will be turned sideways, but should look like the illustration below. Identify the power connector

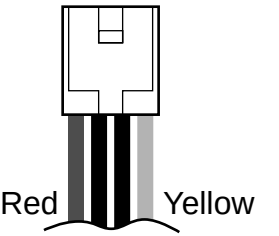


Floppy drive viewed from the back. The floppy connector is at the left and the power connector is at the right.

from the power supply and verify that it is connected to the floppy drive's power connector securely and correctly. Likewise, check the connector from the floppy drive cable. Make sure that it is on all pins securely and that the red stripe is facing the right direction. If the floppy drive is manufactured



The floppy drive cable has 2 sets of connectors. Locate the end of the cable with these two connectors and use the one with the little holes (bottom in this illustration).

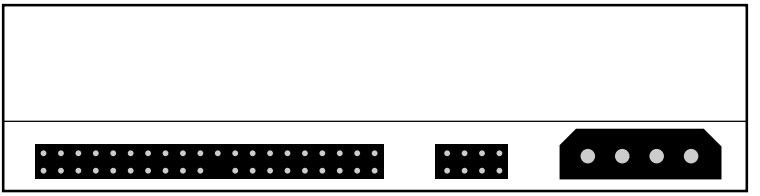


The power connector for the floppy drive comes from the power supply.

by TEAC the stripe should be toward the power connector. If the drive is manufactured by Panasonic the strip should be facing out from the drive.

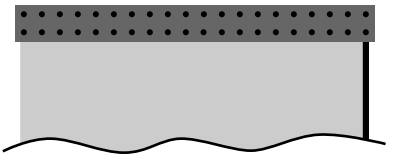
Checking the hard drive cables

Once the case is open, locate the hard drive. In most cases the hard drive is next to the floppy drive. In some cases

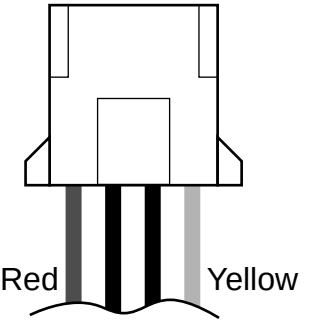


Hard drive viewed from the back. The IDE connector is at the left and the power connector is at the right.

though, the hard drive is located under the power supply. In this instance, the drive is extremely difficult to work with and should not be attempted in the field. Identify the power connector from the power supply and verify that it is connected to the hard drive's power connector securely and



The IDE cable has three connectors. Use the connector to the far end of the cable.



The power connector for the hard drive comes from the power supply

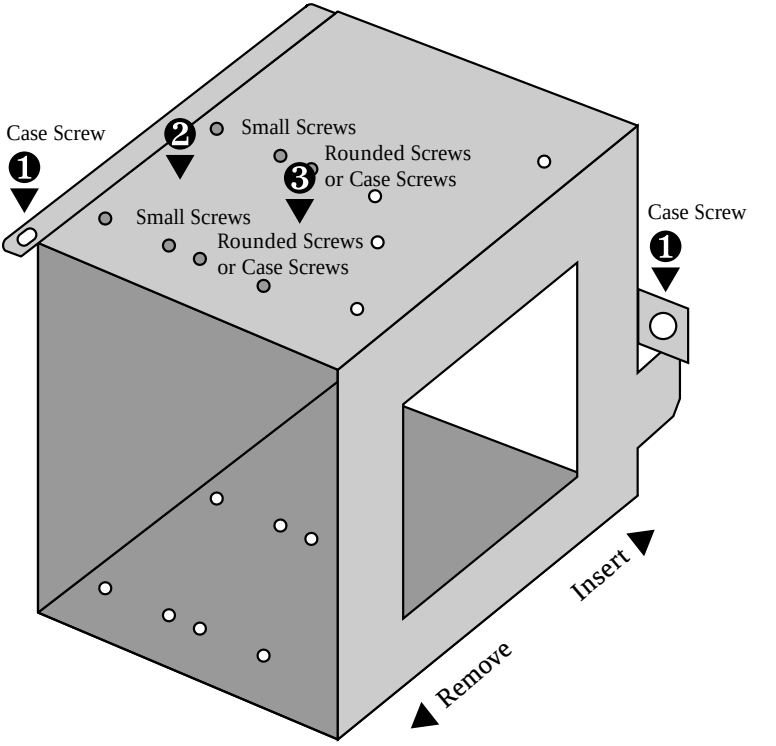
correctly. Likewise, check the connector from the IDE cable. Make sure that it is on all pins securely and that the red stripe is facing toward the power connector. Do not touch any of the jumpers on the drive. Doing so will cause problems with the hard drive's operation.

Changing the floppy drive

The floppy drive is the easiest of the drives to change and the only one which should be considers for changing out in the field. This is also the only component in the Tomra PC that you will be changing which can not use the case screws. Be careful when performing this procedure not to lose any of the screws.

Start the process by removing any of the cables to the floppy drive. If the hard drive is next to the floppy drive, remove the cables from the hard drive also. If the hard drive is not next to the floppy drive, you will not be able to follow these directions exactly as they are written for the newer style case (very few of the Tomra Industrial PCs fall into this category). Keep the cables close by and neat.

Now that all cables are clear, remove the drive cage. There should be two case screws (∂ in the illustration below) at the top left rear and front right side. Remove these screws and the drive cage should free. Hold the drive cage in your right hand (thumb on top and fingers on the bottom) and the case in your left. Pull the cage to the back of the case, then up and out.



Now that you have the drive cage free, set it on a flat surface so that the screws are facing up. Locate the two screws holding in the floppy drive (Σ) and remove them. Turn the drive cage over and remove the screws holding in the floppy drive there. Remember the position of the front of the floppy drive – you will need to replace the new one to meet that point. Gently slide the old drive from the cage. Slide the new drive into place. If you encounter too much resistance, loosen the screws for the hard drive (∏) till the drive slides in to position. Line up the holes for the screws and screw in one side about halfway. Turn the drive cage over, line up the holes, and screw in the screws all the way (loosely tighten, do not over tighten). Turn the cage over and tighten those screws (again, do not over tighten). If you loosened the hard drive screws to slide in the floppy drive, tighten them again.

Pick up the cage and hold it as you did to remove it. Line up the cage with the front of the case and slowly slide it into place. If the cage does not slide into place easily, loosen the screws slightly on the top of the cage and try again. If the floppy drive doesn't seem to slide into the hole in the front of the case, you may have that drive in upside down. If this happens, remove the floppy drive and turn it over. Make sure that everything slides into place nicely. Look on the right side for the tab that screws into the front of the case and make sure that it is flat with the case. From the front of the computer, check the floppy drive and make sure it is flush with the front of the case. If everything lines up correctly, replace the two case screws that hold everything into place. Double check that everything is in securely and correctly, then tighten down any loose screws.

Replace the cables to the floppy drive and hard drive. If you aren't sure about how the cables connect, see *checking the floppy drive cable* and *checking the hard drive cable* for more information.

Turn on the computer and test the floppy drive. If you still have problems with the drive, call PCComplete for assistance.

Glossary

3.5” Drive, can mean either a floppy drive which uses 3.5” floppy disks or a hard drive in a 3.5” form factor.

3.5” Form Factor, the size of a 3.5” drive (4” wide by 1” tall).

5.25” Drive, can mean either a floppy drive which uses 5.25” floppy disks or a hard drive in a 5.25” form factor.

5.25” Form Factor, the size of a 5.25” drive (6” wide by 1.625” tall).

AMD, stands for Advanced Micro Devices, manufacturer of processors for PC and other computers.

ASUS, short for ASUSTek, one of the top manufactures of main boards, video cards, and accessories.

BIOS, stands for Basic Input/Output System. Controls the operation of the computer.

Biostar, a manufacture of main boards and video cards.

Case, the housing for all the components of the computer.

CMOS, short for CMOS RAM and stands for Complementary Metal Oxide Semiconductor. Used to store parameters for the computer's operation.

COM, term used to describe serial ports under DOS and Windows. The term comes from communications devices (such as modems) which are generally attached to serial ports.

Compaq, manufactures pre-assembled, integrated PCs.

CRT, stands for Cathode Ray Tube, describes the picture tube used in monitors. Many people also use CRT to refer to the monitor

Cyrix, manufacture of processors for PCs.

DB9, a type of connector (either male or female) with nine pins in two rows (one row of five, the other four) and a metal outer shielding with four sides and rounded corners.

DB25, a type of connector (either male or female) with twenty-five pins in two rows (one row of thirteen, the other twelve) and a metal outer shielding with four sides and rounded corners.

DELL, manufactures and markets PCs.

Display, *see monitor*

DIMM, stands for Dual Inline Memory Module. These are used as the computers RAM.

Drive Cage, the holder for the drives in a computer.

EDO, short for EDO RAM, and stands for Extended Data Out.

EISA, stands for Enhanced Industry Standard Architecture.

Female, connects to a male, this is the opposite connector. Generally the female has the holes for the male connector's pins.

Floppy Disk, removable storage media which uses flexible (usually plastic or mylar) disks with a magnetic coating. Available in two sizes for PCs – 5.25" (five and a quarter-inch) and 3.5" (three and a half-inch).

Floppy Drive, the device which reads and writes to floppy disks.

Gateway 2000, also known as Gateway, manufactures and markets PCs.

Hard Disk, *see hard drive*

Hard Drive, the disk drive which uses hard (generally metal) platters to store information magnetically. This is not the same and should not be mistaken for floppy disks with hard plastic shells. Hard drives are generally not removable.

HD15, a connector which has three rows of pins and is similar to the DB9. Generally used for video connections.

I/O, stands for Input/Output. Describes the process of moving information through the computer.

Intel, the industry's leading processor manufacturer, also the company which dictates the direction of the PC processor market.

ISA, stands for Industry Standard Architecture. It is an 8- or 16-bit card bus.

Jumper, little plastic blocks with metal connections inside. Used to close (connect) pins. Generally used to hard configure devices.

Jumper Blocks, a series of pins used to configure hardware with jumpers.

LPT, term used to describe parallel ports under DOS and Windows. The term comes from the term Line Printer.

Male, connects to a female, this is the opposite connector. Generally the male has the pins for the female connector's holes.

Memory, the place where the computer stores information.

Microsoft, The largest software company, publishes DOS, Windows, Word, Excel, and many other programs.

Modem, stands for Modulator/Demodulator. This is a device that allows computers to communicate over standard telephone lines.

Monitor, also known as the display or CRT.

Parallel Port, a type of interface that allows computers to talk to devices such as printers.

PCI, stands for Peripheral Component Interface. 32-bit card bus

Pins, small metal posts for making connections.

Power Supply, the component in the case which provides power to each of the components.

Processor, the main chip of the computer where most instructions are handled.

RAM, stands for Random Access Memory. *See Memory.*

ROM, stands for Read Only Memory.

Serial Port, a type of interface that allows computers to talk to devices such as modems or mice.

SIMM, stands for Single Inline Memory Module. These are used as the computers RAM.

S-VGA, an extension to the VGA standard.

Super-VGA, see S-VGA

Trident, manufacturer of video cards.

USR, stands for USRobotics. *see USRobotics.*

USRobotics, manufacturer of modems and other peripherals.

VLB, stands for VESA Local Bus. This is an extension to the ISA slots used to improve the speed of cards such as video and I/O.

VGA, stands for Video Graphic Array. This is generically to term used for video cards.

Video Card, the device which converts information from the computer into information which can be displayed by the monitor.

Video Connector, the connection on the back of the video card (and sometimes monitors) which is usually a HD15.

Service & Support Info

This section of the reference guide contains information on service and support issues. This includes some basic information which should be followed while working on a computer and information about how to get assistance and service.

Working on the computer

The most important thing to remember when working on a computer is that it must be turned off before you begin working on it. If the computer is on while you are installing cards or changing cables the computer will be damaged.

Almost as important is that nothing is forced in or out of a computer. Most parts will require very little force to either install or remove them. If you are needing to force the part, stop and look it over. Is there a screw which should have been removed? Is there something in the way? Do you need to remove a part near that one? Is this the right place for the part? If you still have problems, consult someone else who works with these computers. Most importantly, do not force anything.

Grounding information

It is import that you do not have any static electricity built up when you are working on any electronic equipment. A static discharge can occur without you being aware of it and that slight a shock could destroy components used in electronic equipment.

Though the computer is protected from the outside, the inside is still vulnerable. While working on the computer, you can reduce the risk through a few easy steps:

1. Once the case is open make sure the power cable is plugged into the power supply. Touch the metal on the power supply to discharge any build up.
2. Avoid moving your body. Static will build up from the friction of the clothes against your body. It's impossible to stand perfectly still, but attempt to move as little as necessary.
3. Avoid wearing jewelry. Metal is a good conductor of electricity and can increase your chance of both creating and discharging static electricity.

Common tools

Working on the Tomra Industrial PC, there's really only one tool you will need – a phillips screwdriver. All of the screws you will need to use are phillips. Many computer technicians also like to have a flat head screwdriver, a needle nose pliers and screw grabber. Though these are all good tools to have, they are not needed for the work you will be performing in the field.

The case screws

Though there are three types of screws used to assemble a Tomra Industrial PC, you will only need one. The case screw is used for just about everything but the main board and floppy drive. The screw uses either a phillips or a hex driver.

Opening and closing the case

Depending on which case you are working with the procedures vary slightly. First, remove the three or four screws (depending on the case) at the back of the case near the outer edge. If the case has four screws, look for two on each side. If the case has three screws, look for one on each side near the bottom and one across the top in the middle. Take hold of the case from the side and pull back about a quarter of an inch. Rock the lids up from the back and pull is off.

To close the case is little more difficult. Hold the lid from the sides again. Lift the back and point the front lip into the front of the case. The lid should be at roughly a thirty degree angle. Slide the lip forward onto the front of the case. Slowly lower the lid down, making sure not to close any cables in the case. There is a lip in the lid of the case which needs to catch on the sides of the bottom part of the case. Push in on the sides as you're closing the case and the lip should catch. Once the lid is down, run your fingers along bottom of the case and make sure that there is not a gap between the lid and the bottom of the case. Do not screw the case together if there is a gap! Once the lid in down correctly, slide the lid forward till it closes against the back of the case. This may be a little tricky. Take your time and don't rush. Check again that there is no gap between the bottom of the case and the lid. Replace the screws in the lid.

Making service requests

If you have a computer, monitor or printer which needs to be returned for service, it is important that you include as accurate and complete a description as you possibly can. Without a good description of the problem it is difficult to track down the problem in service. It is possible that hardware without a good description could be returned without being fixed.

All items which need to be serviced should go through the Tomra Michigan office. They will be processed there for servicing by PCComplete.

Assistance while in the field

If you have run into a problem with a machine you're servicing, please contact PCComplete at 248/545-4211. Please ask for a technician familiar with the Tomra Industrial PCs.